Centre des sciences de la mer Huntsman Marine Science Centre

Huntsman Marine Science Centre

The Conference Board of Canada

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Annual Report 1999/2000

1999- 2000

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CHAIRMAN'S REPORT

The Huntsman Marine Science Centre was launched in the wave of academic expansionism which characterized the 1960's. Resources were abundant and idealism was high. Times have toughened; financial pressures have been especially extreme for the past decade. Some academic organizations confronted with this challenge have ceased operation, others have narrowed their sphere of activity. The HMSC has responded more creatively; it has broadened its areas of engagement. This strategy has brought many benefits. Our teaching programs are now aided by hugely improved residences and laboratories. Our research enterprise has been stimulated by the enhanced facilities at the ARC, as well as by the development of new labs and aquaculture facilities.

Despite these successes, Huntsman has not escaped the last decade unscathed. University memberships have declined and contributions from both NSERC and our core member institutions have failed to offset the escalating costs of operation. These resource constraints have led to the gradual accretion of a debt load which could threaten the survival of our organization. I am disappointed to report that the past year has seen a further operating deficit. Clearly changes need to be implemented which both enhance funding and streamline management to ensure that the HMSC not only survives, but thrives in the next decade.

Because of this critical need to explore new options, the Executive Director and Board of Directors have, over the past year, conducted two major reviews which have jointly aimed to provide direction for the future. In late October, the full Board convened for a 2-day Operational Review of Huntsman. This meeting aimed to identify changes in operating practices or facilities which would either encourage enhanced use of the facilities or increase user satisfaction. This meeting produced several directives for action which have already been implemented – a new lecture room has been developed, accommodation has been refurbished and proper internet connectivity established. A Strategic Review was subsequently launched in November which induced a cascade of meetings that examined the future of the HMSC from diverse perspectives. These discussions suggest that major structural changes are needed, that fiscal management must be tightened and that HMSC staff must gain increased responsibility while accepting more accountability. A broad consideration of the key recommendations from the Strategic Plan will form an important element of discussions at the Board Meeting in June 2000.

The Huntsman Board also launched the search for a new Executive Director in early 2000. Candidates have been shortlisted and the Director designate will be identified shortly. This action, of course, signals the fact that Dr. John Allen will soon complete his second term as Executive Director, entitling him to a well earned escape from administrative responsibilities. I would like to take this opportunity, on behalf of the Huntsman community at large, to thank John for both his enormous dedication to our organization and his strong leadership over the past decade. He has played a critical role in developing facilities which have set the stage for the HMSC to extend its influence.

The challenge for the future lies in making best use of our new infrastructure. On this front, there is cause for optimism. Certainly our mission remains relevant. As fisheries collapse, as environmental change threatens marine biodiversity at large, the need for education and research on marine ecosystems intensifies. The Huntsman's ability to contribute to these national concerns is increasingly recognized and there are hopeful signs that this will lead to increased funding. The launch of a new 12-week summer semester will lead to a doubling in user days from the university sector in fiscal 2000. The establishment of AquaNet, a new Centre of Excellence in aquaculture, promises both increased usage of our research facilities and the opportunity to host more research and educational groups. Our nascent Strategic Plan also calls for a strengthened partnership with local aquacultural industries. With opportunities such as these, the future looks bright but it is not secure. There remains a need for the Huntsman community to work collectively to both identify and capitalize upon other opportunities which may aid our organization.

In closing, let me express my regret for a report which is not more aggressively optimistic. However, we have been confronted with a challenge worthy of a new millennium. I am nonetheless confident that our actions will lead to a newly invigorated HMSC and look forward to celebrating the resultant successes in the next Annual Report!

Dr. Paul D. N. Hebert

EXECUTIVE DIRECTOR'S REPORT

Part One

In preparing my 11th Annual Report as Executive Director, I cannot remember a year with more highs and lows.

Our highs came in a number of different forms. Last September, Huntsman received a lot of publicity at the time of issue of the Canada Post Millennium Stamp honouring Dr. Archibald Gowanlock Huntsman, for whom our centre is named. In addition, the annual evaluation completed each year on Huntsman as part of our request for funding by the Natural Sciences and Engineering Council (NSERC) was very positive:

Huntsman Millennium Stamp

"Huntsman is the only marine facility of its kind in Canada providing a strong and continuous interface between Government/Private Sector/Universities. It is a very strong regional facility (Maritimes and Ontario) and to a lessor extent nationally and internationally. It is a good training facility for highly qualified personnel destined for all three sectors."

Thirdly, we have just received national recognition as **Canada's Top Employer of Youth** for New Brunswick by The Conference Board of Canada for the year 2000, one of twelve in Canada.

Our new Quonset huts for aquaculture officially opened last June allowing us to begin the small flatfish research project. Over the winter, a provincial program was utilized to hire 6 individuals to help build new restroom facilities at the Aquarium and add a new faculty apartment for the University of Guelph.

In addition, the Carroll Wright Room was enlarged and refurbished to make a lounge area and a lecture theatre for thirty students. Chairs for this room were generously donated by Cambridge Suites Hotel of Toronto, as a result of the tireless efforts of Ann Evans, Chairperson of our Advisory Board. Internet and email access established for most of our facilities on the lower campus should reach the Christofor Lab in time for the summer season and this will, no doubt, be the most satisfying change for our University members, again funded largely through the efforts of Ann Evans.

We also undertook a Strategic Planning process during the year with the assistance of Ernst & Young, the results of which will be presented at the Annual General Meeting for approval. Last, but certainly not least, we laid the groundwork for our very **first semester course** (May to July) in conjunction with the University of Guelph. And due to the tenacity of our Chairman, Dr. Paul Hebert, new mattresses were obtained for Needler Hall where all university students are housed.

Lows came from constant financial problems and in this respect, I have not experienced a more stressful year. Unfortunately, we suffered a significant loss in operations in 1999-2000, at least $90,000 of which resulted from inaction on the part of the New Brunswick Department of Agriculture, Fisheries and Aquaculture (NBDAFA) relating to the small flatfish program. This is outlined in more detail in Part Two of my Report.

The Conference Board of Canada Award Presentation - May 1, 2000. With Dr. Allen and Carol Baker are sponsor representatives, Howard Green of HRDC and Laurie Edwards of the NS Dept. of Education.

Although the details of each individual department's performance are provided later in this report, I will highlight each section.

In the Education Branch, the Academic program did not meet its objectives in courses delivered but exceeded projections in the number and diversity of researchers utilizing our facilities. Some of these researchers have proposed very significant programs for the next two or three years, the NSERC Strategic Grant in which Dr. Mick Burt participated being one of them. Fortunately, the lower than expected numbers of students taking university courses was counterbalanced by the Public Education program having a very good year. The Aquarium also had a successful year with over 30K visitors and a new seal pup providing extra interest in the early part of the season. In addition, several successful workshops and conferences were hosted here at Huntsman.

In the Applied Research Branch, the relative newcomer, the Atlantic Salmon Broodstock Development Program did very well producing in excess of 300,000 smolts and, at a higher than industry average weight. In addition, some parr were also sold helping to provide revenue to fund participation in a three year collaborative program with the University of Guelph.

Branding Pedigreed Smolts

The aquaculture programs did surprising well despite the confusion mentioned above. Maritime Mariculture Inc. (MMI) raised 10,000 halibut juveniles and the small flatfish program raised 15,000 winter flounder and 8,000 yellowtail flounder. The growth of the two earlier year classes of sturgeon continued to please our industrial partner, Supreme Sturgeon and Caviar. Some of these fish have been in a 25 ft. diameter tank for six months at a stocking density that has risen from 80 kg/m^3 to over 100 kg/m^3. Some 3 year old fish are now well over 3kg and **could** produce caviar in the fall of 2000 or spring of 2001, much earlier than expected. The 1999 spawning was largely unsuccessful due to teething troubles with the water heating boiler.

The Atlantic Reference Centre had a successful year completing the final phase of the U.S. National Marine Fisheries Service GLOBEC contract that has kept many of our part-time staff occupied almost full time for the past three years. The installation of two more compactor shelving units this summer, one funded by The Tecolote Foundation and the other by Fisheries and Oceans Canada (DFO), has allowed most of the phylogenetic collection to be properly housed.

In the Administration Branch, staff have struggled through a number of changes and staff reductions. They have coped with managing the strategic planning exercise; developing and adjusting to a new fiscal reporting system; learning new computer programs; and streamlining operations where possible. Fundraising has gone well this year with donations and annual giving up 45%. Maintenance also bore a very heavy load, coping with all the above noted building renovations and the water line breaks and other problems that winter often throws at field stations.

In closing, I'd like to sincerely thank all staff for their support and efforts in making things run smoothly and seamlessly for our users and the public during a very trying year. I would also like to thank Board and Advisory Board members, both current and past, for all their encouragement in our endeavours over the past 10 years.

John H. Allen, Ph.D., P.Eng.

EXECUTIVE DIRECTOR'S REPORT

Part Two

SMALL FLATFISH PROGRAM
SUMMARY OF ISSUES

The small flatfish program has been the main cause of the 1999/2000 deficit. This article attempts to lay out the facts to allow Huntsman members to judge for themselves the actions which precipitated this situation. In hindsight, the small flatfish program should at least have been delayed but, I believe, not abandoned. It is still my belief that the addition of the Quonset buildings will be to the benefit of Huntsman's growth in the years to come.

The construction of the Christofor Lab was financed by a grant from The Sir James Dunn Foundation, for University research, with matching funds from the Atlantic Canada Opportunities Agency (ACOA), for industry research. While university usage has been low, aquaculture programs in halibut, sturgeon, and transgenic salmon, have utilized the basement labs.

By 1997, successes in the halibut and sturgeon projects were such that additional space was needed. Also, a core team was needed to be able to replace these projects when they moved to commercialization in three to four years. It was thought that flounder could be the solution as the New Brunswick Department of Fisheries and Aquaculture's (NB-DFA) listed them as one of five key species for aquaculture development, and Huntsman had previous experience with them.

Pressure from industrialists to provide space for halibut and sturgeon along with continued interest from various industry groups provided the rationale to blend the flatfish program into a proposal to ACOA. The two Quonset buildings were the outcome of this proposal.

In November 1998, and again in January 1999, three Grand Manan fishing industrialists met at Huntsman with NB-DFA staff, ACOA and NRC-IRAP. On both occasions, all present were given assurances by the assistant Deputy Minister, on behalf of the Deputy Minister of the NB-DFA, that site licenses would not be a problem. Based upon this, arrangements were made so that NRC-IRAP could contribute $60,000 and the businesses $30,000 but this would, of course, not happen until site licenses were issued. Additional arrangements were made to assemble a team under Dr. V. Puvanendran.

In March 1999, the Alternate Species Committee recommended the flatfish program be awarded $100,000. By April, it became clear that the NB-DFA monies would not be available until mid-year so ACOA reconfigured their funding to provide a contribution to operating funds. While the NB-DFA funds came through in September, the industrialists were still being told the "licence will be available in a week or so".

By September, I have to admit, fiscal control of the flatfish projects and Quonset hut construction was lost. To this point, Huntsman had financed the project, with ACOA's support, on continual assurances that NRC-IRAP and industrialist funding would come through. When the NB Minister of Fisheries was approached for fiscal help his written response in March, 2000 was:

> *"The Department, on the recommendation of the New Species Committee, committed $100,000 from last years budget and is proposing funding of your program for the new fiscal year. We will attempt to increase the level of funding for this new year to the level of $150,000, this will be subject to the full approval of the New Species program."*

In March 2000, two industrialists received their licences. However, new problems arose. Because these businesses desire to produce witch flounder, they were only willing to work with the winter and yellowtail flounders initially in order to get experience. Since Huntsman has no access to broodstock, I have been trying for nearly a year to get through federal red tape to bring 100 hatchery-reared witch flounder in from the Ocean Science Centre in Newfoundland. We have now negotiated a procedure so that this can be done. However, it is still unclear if the second year of provincial funding will go ahead.

We are currently hatching winter and yellowtail flounder in 2000 in the hope that the Minister's promise will be realized.

John H. Allen, Ph.D., P.Eng.

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Financials

SUMMARY OF AUDITED REVENUES AND EXPENSES APRIL 1ST, 1999 TO MARCH 31ST, 2000

	Operating Fund	ASBDP Fund	Capital Asset Fund	Development Fund	Scholarship Fund
Revenues					
Contracts and grants	$ 874,176	$ 744,645	$ 308,366	$ 40,975	$
User fees and sales	543,109	403,789			
NSERC funding	154,261		15,739		
Membership fees and donations	76,144				2,660
Other	141,350	69,870		6,584	901
	1,789,040	1,218,304	324,105	47,559	3,561
Expenses					
Employment costs	1,061,149	277,892			
Purchased materials and services	811,712	772,318		126	7,702
Amortization of capital			147,020		
Interest on long-term debt	38,853	29,644			
	1,911,714	1,079,854	147,020	126	7,702
Surplus (deficit)	$ (122,674)	$ 138,450	$ 177,085	$ 47,433	$ (4,141)
Fund balances					
Beginning of year	$ (527,970)	$ 59,715	$ 3,079,002	$ 214,358	$ 44,822
Surplus (deficit)	(122,674)	138,450	177,085	47,433	(4,141)
Loan payments made	(15,000)	(70,594)	85,594		
Transfer of assets	(15,109)	(48,300)	130,311	(66,992)	
End of year	$ (680,663)	$ 79,271	$ 3,471,992	$ 194,799	$ 40,681

PURPOSE OF THE FUNDS:

- Operating Fund reflects the day to day activities of the Huntsman Marine Science Centre.
- The Atlantic Salmon Broodstock Development Program (ASBDP) Operating Funds reflect day-to-day activities of that Program. ASBDP operations are reported separately as any surplus or deficit generated is the responsibility of the Salmon Industry partners for whom Huntsman administers the Program.
- The Capital Fund reports the assets, liabilities, revenues and expenses related to Huntsman's capital assets.
- The Development Fund reports the assets, liabilities, revenues and expenses related to the future development of Huntsman's facilities.
- The Scholarship Fund reports the contributions and payments related to Fellowships and Scholarships.

Financials

EXPLANATION OF FINANCIAL RESULTS

Operating Fund

- Huntsman suffered a deficit of $122,674 in 1999/2000. This came as a result of many factors, the most significant of which was the small flatfish program. In it, revenues of approximately $117,000 were lost and additional expenses of approximately $17,000 were incurred due to delays by the Provincial government. The problems experienced with this program have been described in part two of the Executive Director's report.
- Loan payments were made by the Operating Fund for long-term debt tracked in the Capital Asset Fund. This debt was incurred in constructing Needler Hall. These are not paid by the Capital Asset Fund as that fund does not have a bank account.

ASBDP Fund

- Posted a surplus of $138,450 this year. This resulted from the program producing far more smolts for sale to its industrial partners than had been anticipated.
- Loan payments were made by the program for long-term debt tracked in Capital Asset Fund. This debt was incurred in order to upgrade the hatchery. These are not paid by the Capital Asset Fund as that fund does not have a bank account.
- The asset transfer is for a heat exchanger and fish-counting and sorting equipment.

Capital Asset Fund

- Contracts and grants revenue was generated from a number of sources. The most significant of these were $235,534 received from the Atlantic Canada Opportunities Agency and $52,812 from the New Brunswick Department of Fisheries and Aquaculture for completion of the Quonset Huts. Donations were provided by The Harrison McCain Foundation and The T.R. Meighen Foundation for the computer upgrade.
- NSERC major facilities access grant was utilized to finance the purchase of an engine for the creenoe and half the costs of a compactor shelving unit for the Atlantic Reference Centre (ARC).
- Amortization of capital is an estimate of the decline in value of Huntsman's assets over the year.

Development Fund

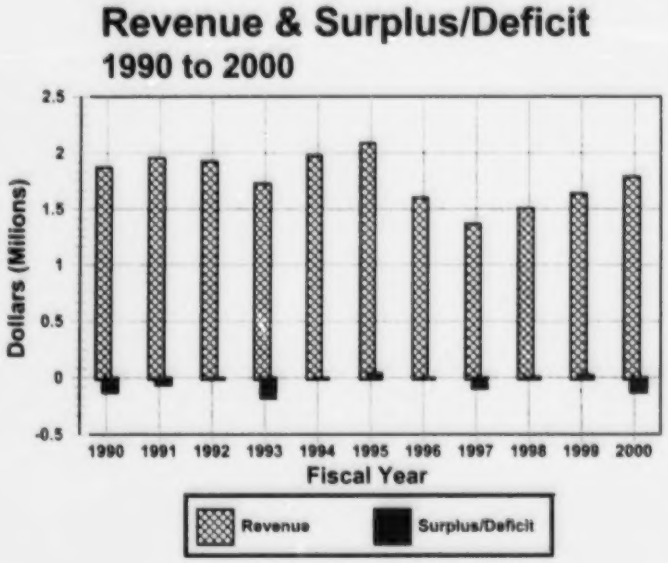
- Contract and grant revenues have been recognized from the Tecolote Foundation and the University of Guelph. The Tecolote Foundation generously donated $25,000 which was utilized to fund the remaining half of the compactor shelving for the ARC, and for computer upgrades around campus. Funds from the University of Guelph are to pay for the renovation of their apartment.
- Asset transfers include the Computer upgrades, Aquarium extension, Carroll Wright room renovations, and Guelph Apartment renovations.

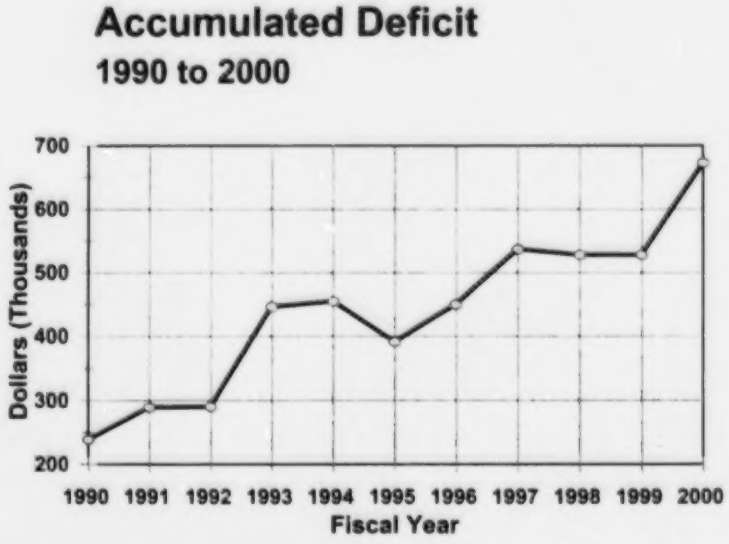
Scholarship Fund

- Donation revenues have been recognized from Dr. John Allen, Dr. Michael Burt, and Mr. Rowland Frazee.
- Other revenues relate to interest earned on the balance in fund.
- Purchased materials and services relate to expenditures made to recipients of Fellowships and Scholarships during the year.

Financials

SUMMARY OF AUDITED FINANCIAL RESULTS, 1990-2000





Academic Program

University Summer Courses - 1999

Of the 14 courses offered in the summer of 1999, eight had to be cancelled due to low enrolments. Although this resulted in a reduction of revenues to Academic Programs, the reduction in expenses more than compensated for this loss. The courses that did run were: **"Diversity, ecology, and behaviour of marine invertebrates"** (Carleton University); **"Introduction to marine biology"** (University of New Brunswick); **"Advanced marine biology"** (University of Guelph); **"Experimental studies in marine biology"** (University of Western Ontario); **"Marine biology"** (University of Toronto); and **"Biology of marine mammals"** (McGill University).

Other University Courses

In addition to the summer field courses, a number of field trips and short courses were run during the academic year as part of ongoing courses at several eastern universities. These included: **"Fisheries and Wildlife Management"** (McGill University, Dr. M. Curtis), **"Marine Biology"** (Mount Allison University, Dr. I. Kaczmarska), **"Aquaculture"** (Université de Moncton, Mr. E. Bataller), **"Oceanography"** (Université de Moncton, Dr. G. Miron), **"Aquaculture in Canada"** (University of New Brunswick, Dr. T.J. Benfey), **"Phycology"** (University of New Brunswick, Dr. G.W. Saunders) and **"Clinics in Veterinary Science"** (University of Prince Edward Island, Dr. L. Hammell).

University Summer Courses - 2000

For the summer of 2000, a full **"Semester Program"** is being offered by the University of Guelph. This contains four individual courses in series: Invertebrate Zoology II, Zool 2080 (Dr. J.C.Roff); Life strategies of plants, Bot 2100 (Drs. R. Sheath, L. Peterson, M. LaCroix); Invertebrate Zoology I, Zool 2070 (Dr. M.D.B.Burt), and a Project Course, Biol 3200 (Dr. S. Crawford). Running concurrently with the Guelph courses are **"Introduction to Marine Biology"** May 7-19 (UNB, Dr. Charlene Mayes); **"Field Ornithology"** May 13-27 (U of T, Dr. J.D. Rising); **"Diversity, Ecology and Behaviour of Marine Invertebrates"** June 4-17 (Carleton, Dr. Kathy Conlan); **"Studies in Environmental Science"** June18-July 1 (Western, Dr. J.C. Roff/Dr. M.D. Owen); **"Aquatic Parasitology"** July 2-15 (Saint Mary's, Dr. D.K. Cone/Dr. M.D.B. Burt); **"Marine Mammals & Seabirds"** July 16-29 (Waterloo, Dr. J.F. Schreer); **"Biology of Marine Mammals"** July 30-August 19 (McGill, Dr. Catherine Hood); **"Advanced Marine Biology"** August 20-Spetember 2 (Guelph, Dr. J.S. Ballantyne/Dr. Elizabeth Boulding; **"Marine Biology"** August 22-September 4 (U of T, Dr. D.W. Malloch / Dr. G.M. Telford); and **"Experimental Studies in Marine Biology"** August 22-September 5 (Western, Dr. M.D. Owen).

We have received sufficient registrations for all courses to run thanks to a lot of hard work by *Mr. Haseeb Randhawa* who acted as Academic Secretary for Mick Burt for eight weeks at the beginning of the year. In mid-January, 121 letters with brochures and posters were sent to department heads, chairs and deans of faculties across Canada, 69 letters and posters to university librarians, and 68 letters, posters, brochures and application forms to student associations. These were followed up with e-mail reminders with the posters and brochures as attachments. All course instructors and Huntsman reps also received a brochure and poster. 128 Biology, Botany and Zoology Departments in universities and colleges in the U.S.A., also received e-mails with the brochure and poster attachments. This, along with continuing revisions to our web page, has resulted in five of the eight university courses being full and the other three with enough registrations to be offered without losing money.

M.D.B. (Mick) Burt
Associate Director &
Director, Academic Programs

Courses & Awards

University Courses Offered at Huntsman - 1999/2000

Carleton University/HMSC	Diversity and Ecology of Marine Invertebrates	Dr. K. Conlan
Dalhousie University	Introduction to Animal Nutrition*	Dr. J. Castell
Dalhousie University	Nutrition in Aquaculture*	Dr. J. Castell
University of Guelph	Advanced Marine Biology	Drs. J. Ballantyne/E. Boulding
McGill University/HMSC	Aquaculture of Marine Fishes and Shellfish*	Drs. J. Allen/A. Boghen/T. Benfey
McGill University/Waterloo/HMSC	Biology of Marine Mammals	Dr. C. Hood
McGill University/HMSC	Ecology and Behaviour of Fish*	Dr. R. Rangeley
McGill University	Fisheries & Wildlife Management	Dr. M. Curtis
Mount Allison University	Marine Biology	Dr. I. Kaczmarska-Ehrman
Université de Moncton	Marine Aquaculture	Dr. E. Bataller
Université de Moncton	Oceanography	Dr. G. Miron
University of New Brunswick	Aquaculture in Canada	Dr. T. Benfey
University of New Brunswick	Caller Training & Orientation 2000	Mr. Rick Cuthbertson
University of New Brunswick	Geodesy & Geomatics: Hydro II	Dr. D. Wells
University of New Brunswick	Phycology	Dr. G. Saunders
University of New Brunswick/HMSC	Biodiversity & Systematics of Marine Invertebrates*	Dr. G. Pohle
University of New Brunswick/HMSC	Diseases in Marine Aquaculture*	Drs. J. Johnson/W. Lynch/M. Burt
University of New Brunswick/HMSC	Introduction to Marine Biology	Dr. C. Mayes/Mr. M. Casey
Saint Mary's University/HMSC	Aquatic Parasitology*	Drs. D. Cone and others
Atlantic Veterinary College, UPEI	Clinics in Veterinary Science	Dr. L. Hammell
University of Toronto	Field Ornithology*	Dr. A.W. Diamond
University of Toronto	Marine Biology	Dr. C. McGowan
University of Western Ontario	Experimental Studies in Marine Biology	Dr. M.D. Owen
University of Western Ontario/HMSC	Studies in Environmental Science*	Drs.M. Owen/M. Burt/J. Roff

*Course cancelled due to low registration

Fellowships - 1999/2000:

Dr. J.S.Ballantyne **(University of Guelph)** $2,000 to study elasmobranch cell physiology.

Dr. T.J. Benfey **(University of New Brunswick)** $2,000 to develop ways of sex manipulation of halibut.

Dr. G. L. Chmura **(McGill University)** $1,000 to support her work on salt marsh productivity.

Dr. J.D. McLaughlin **(Concordia University)** $2,000 for work on population dynamics of cestodes in eider ducks.

Scholarships - 1999/2000

The **Rowland C. Frazee (McGill) Graduate Research Scholarship** ($500) was awarded to *Carolyn Beth Beecher,* Msc. - supervision by Dr. Gail Chmura - on determination of sediment accumulation rates in salt

Courses & Awards

marshes and the dynamics involved in salt marsh ecology.

The first **W.B. Scott Graduate Research Scholarship in Ichthyology** ($500) was awarded to *Glen Fines* (**University of Guelph**) - Co- supervised by Dr. J.S. Ballantyne and Dr. P. Wright - focussing on the differences in gill membrane permeability between bony and cartilaginous fishes.

The **Huntsman Graduate Research Scholarship** ($500) was awarded to *Lea-Anne Henry* (**University of Toronto**), MSc. - supervision by Dr. D.R. Calder - on an ecological study of the intertidal hydroid *Dynamena pumila* in Passamaquoddy Bay.

Fellowships - 2000/2001:

University Research Fellowship recipients for 2000 are:

Dr. J. S. Ballantyne (**University of Guelph**) $1,000 to continue his research on membrane permeability in elasmobranchs.

Dr. M. Barbeau (**UNB-Fredericton**) $2,000 to study the behaviour of scallops under predation by crabs and starfish.

Dr. T. J. Benfey (**UNB-Fredericton**) $1,000 to continue work on sex manipulation in halibut.

Dr. D. K. Cone (**Saint Mary's University**) $2,000 to determine what parasites and micro-organisms in wild fish might become pathogens in aquacultured fish.

Dr. I. Kaczmarska-Ehrman (**Mount Allison University**) $1,000 to continue her work on factors affecting sporulation in phytoplankton.

Dr. G. W. Saunders (**UNB-Fredericton**) $2,000 to determine seasonal changes in algal diversity in Passamaquoddy Bay.

Dr. P. A. Wright (**University of Guelph**) $1,000 to initiate research at Huntsman in elasmobranch physiology.

Scholarships - 2000/2001:

Graduate research scholarship recipients for 2000 are:

The **Rowland C. Frazee (McGill) Graduate Research Scholarship** ($500) - McGill student, *Carolyn Beth Beecher* who is working under the supervision of Dr. Gail Chmura on salt marsh community dynamics and how these change over time. Ms. Beecher will use a palaeoecological approach, analysing sediments of three different salt marshes - (Little Lepreau, Dipper Harbour and Chance Harbour) - dating over 200 years back to 1790.

The **Rowland C. Frazee (UNB) Graduate Research Scholarship** ($500) - MSc. student, *Melisa Wong* who is working under the supervision of Dr. M. Barbeau on a study of the behavioural responses of scallops to the presence of green crabs and starfish, two natural predators.

The **W. B. Scott Graduate Research Scholarship** ($500) - *Shawn R. Flynn* (**UNB**) - Ph.D. candidate under the supervision of Dr. T. J. Benfey. His project "Reproduction and sex determination of short-nosed sturgeon" is designed to develop protocols for the aquaculture of these fish to produce faster growing females with larger caviar yield.

The **Huntsman Graduate Research Scholarship** ($500) - *Colin R. Bates* (**UNB**) - Msc. student under the supervision of Dr. G. L. Saunders on the monitoring of seaweed biodiversity with respect to communities, species, and their genetic compositions.

We offer our congratulations to all the scholarship winners.

Public Education Program

During the 1999 field season, 814 students accompanied by 89 teachers/adults, participated in on-site programs. This is the largest number since 1994. One reason for the increase is the growing interest from within New Brunswick, thanks to help from the NB Department of Education, the NB Teachers Association, the Sir James Dunn Foundation, the McCain Foundation, the St. Croix Estuary Project (SCEP) & Flakeboard Co. Ltd.

The NB Department of Education supports the Public Education Department by being a member of the Huntsman and offers financial backing to NB teachers who register for our summer institutes.

Royal West Academy, Quebec

Dwain McLean, Executive Director of the New Brunswick Teachers Association, graciously offered free booth space at their major spring workshop for high school teachers which provided valuable advertising exposure. The Sir James Dunn Foundation and The McCain Foundation continue to support our summer courses for high school students; while the St. Croix Estuary Project and Flakeboard Co. Ltd. combine resources for an "on the river" program during which local grade 5-6 students become familiar with their own "backwater". We have not had this level of New Brunswick support in a while - let's hope the trend continues!

Over twenty-five schools (see following list) are regular attendees at the Huntsman and most of these re-book as they are leaving. This makes it hard for new groups to break into the rotation. The only space regularly available is in the shoulder seasons, which extends the field season from April until October.

The *Marine Science Institute* for teachers was totally booked this year and the new course, *Field Ornithology*, attracted enough interest for a trial run. The fortunes of these courses seem tied to the contract negotiations of Ontario teachers, as they only seem to come every second year. Slowly more teachers from other provinces are being attracted to these courses. The *Field Ornithology* course gives teachers hands-on experience with collecting field data, as they participate in banding projects for songbirds and gulls. Last years' participants have the scars from the chickadees and Great Black-backed Gulls to prove it.

Not only are the Huntsman summer courses for high school students a great way of spending a week, they also look good on a resume. *Lauren Trute* found this to her advantage, as she landed a summer job with the Public Education Department last year. Lauren had attended both the *Marine Biology* and *Marine Vertebrate* courses. She is presently finishing the Fish and Wildlife Technician Program at Sir Sandford Fleming College and hopes to obtain a more permanent job in the marine biology sciences.

Teachers' Institute

Public Education Program

We continue to operate the St. Andrews Banding Station and submit data to the nationwide Monitoring Avian Productivity & Survivorship (MAPS) project.

It takes a lot of hard work to set-up programs, meal schedules, labs, boat trips etc. for 814+ students and it cannot be done without teamwork within the organization. I would like to thank everyone who helped me, especially at the end of season when the energy level was low. The best part -- we can all look forward to doing it again next year!

We thank The Sir James Dunn Foundation and The McCain Foundation for their continued support of Huntsman summer courses for high school students - *An Introduction to Marine Biology* and an *Introduction to Marine Vertebrates*, respectively.

1999 Public Education Groups

Andover Elementary School, NB
Beechwood School, QC
Eastport High School, ME
Eastview Secondary School, ON
Elderhostel
Garden Creek Elementary School, NB
Glenburnie School, ON
Glenview Senior Public School, ON
Hartland High School, NB
Holy Trinity High School, ON
Hudson High School, QC
Mother Teresa High School, ON
New Maryland Elementary School, NB
Northern Secondary School, ON
Quinte Secondary School, ON
RCS - Netherwood School, NB
Royal Vale High School, QC
Royal West Academy, QC
Saint Croix Estuary Project, NB
Saint John High School, NB
St. Clement's High School, ON
St. John's Kilmarnock School, ON
St. Mark's Catholic High School, ON
St. Paul's Catholic High School, ON
St. Stephen Middle School, NB
Sedbergh School, QC
Vincent Massey Public School, NB

1999 Public Education Courses

Marine Biology for High School Students
Marine Veterbrates for High School Students
Marine Science Institute for Teachers
Field Ornithology for Teachers

Grackle

Tracey Dean
Public Education Coordinator

Aquarium/Museum

The Aquarium/Museum continues to educate and entertain school groups and the general public with displays of aquatic organisms, predominantly from local freshwater lakes and streams, brackish estuarine and salt marsh habitats, and marine habitats. The objective is to provide natural or near-natural environmental conditions to exhibit the diverse life-forms found in the Passamaquoddy Region. Services include interpretive tours and beachwalks, the supply and care of aquatic organisms for research and education, and display design consulting.

Principal revenue sources include admission charges and retail sales through the Gift Shop. A fundraising initiative in 1999 raised $1,104 through raffle ticket sales to go toward the repair or replacement of our seal pool. For the second year, we gratefully acknowledge Bryan Amyot of Amyot and Watt Ltd. for the contribution of a beautiful piece of Swedish crystal as first prize. The crystal was won by Mr. Leon Girouard of Saint John, N.B.

1999 Crystal Winner - Leon Girouard

A second raffle prize was donated by Evan and Michelle Ross of Cottage Craft Tweeds & Yarns. Ms. Sue Thompson of Grand Bay-Westfield, N.B. was the winner of a beautiful hand-made Cottage Craft sweater. Aside from producing these funds, the raffle ticket fund raiser displayed our good intentions to improve these facilities.

Our excellent seasonal staff included *Mary Sollows* - a new Interpretive Program Co-ordinator, *Heather Holmes* - a veteran Cashier, *Monic Morgan* - an experienced Interpreter, *Nicolla Johnson* and *Jamie Fougere* - new interpreters, and a number of other volunteers. We also provided a work placement for *Jenny MacDonald*, a co-op student from Sir James Dunn Academy.

Sweater Winner - Sue Thompson

The Aquarium/Museum was open for business for 175 days, and Admission revenues of about $91,000, were at an all-time high. The total number of visitors for the 1999 season was 31,221 - 2.5% higher than in 1998 and up 6.1 % on the 13 year average for the period 1987-1999. Gross sales decreased 4% making 1998 sales our all-time high. Gross sales revenues as a percent of sales plus admission revenues were 42.8 % in 1999 compared to the 5 year average of 43.3 % for 1995 to 1999. Each visitor, on average, spent $5.09 in 1999 compared to the 5 year average of $5.02 for the period 1995 to 1999. This was, however, a drop from $5.22 for 1998.

This past year we produced a Christmas flyer to take advantage of the peak retail season and to solicit donations. Production of the flyer was a major undertaking that attempted to optimize conditions for sales during the holiday season. Designed in-house, it was professionally produced in full colour providing a high quality appearance. Flyers were distributed to about 1,500 homes locally with another 1,500 sent to more distant locations throughout Canada and the US utilizing our database of recent visitors, raffle ticket sales and

Aquarium / Museum

"Name the Seal Pup" contest entrants. We hope the next step in the process of expanding retail sales is the addition of retail advertising to the Aquarium/Museum section of the Huntsman web site.

On June 1, 1999, our female harbour seal, Chelsea, gave birth to her seventh pup in as many years. This pup was carefully observed by Dr. Rita Anderson of Memorial University as she looked for a specific behaviour that would indicate an olfactory connection between mother and pup.

"Millie"

The pup was named Millie by Sandy MacKay who told a wonderful true story of how he and his children helped a young seal find its way back to water after it strayed inland. In the middle of a March snow storm they found the seal on Sandy's grandmother's front lawn. Sandy won a season's pass to the Aquarium/Museum and a copy of Bev and Milly Scott's book, "Atlantic Fishes of Canada". Actually, our second reason to name the seal pup Millie was in honour of Milly Scott. Milly and Bev had recently relocated to Kingston, Ontario leaving behind many friends in St. Andrews.

Millie's people-oriented personality made her an ideal candidate for life in captivity so we were delighted, and extremely fortunate, to find a very good home for her at the Granby Zoo in Quebec.

Throughout the winter of 1999/2000, the much-needed washrooms were built with the assistance of the provincial "Community Pride Program". The old washrooms were replaced with modern facilities accommodating three times the number of users. A wheelchair accessible washroom with a baby change table are part of the new facilities.

Sandy MacKay and Family

Future plans will focus on resolving the issue either to upgrade the existing Aquarium/Museum or to begin the process of developing a new facility. This issue is part of the strategic planning process currently underway at Huntsman. Perhaps the force that drives this issue of upgrade or replacement the most is the need to develop new seal-holding and display facilities. Although present facilities are adequate, contemporary attitudes and expectations are undoubtedly in favour of a more aesthetically pleasing seal display.

One of our future challenges will be to build on prior fundraising initiatives to support the development of a new seal facility. Mats Jonasson, the artisan and producer of the beautiful Swedish crystal sold in our shop, has generously donated five pieces of crystal valued at $2,610. Our goal is to use this donation to generate funds of three or four times this value. Also, Bryan Amyot also arranged for an Aquarium/Museum article to be published in "*Message from Mats*" a magazine published as part of the "Mats Jonasson Collectors' Society". We appreciate Bryan's contributions in promoting this very positive relationship between the Huntsman, Amyot & Watt and Mats Jonasson.

Jim McElman
Manager

Quoddy EMAN Site (QES)

In spite of the elimination of core funding by Environment Canada, Huntsman has been able to maintain its monitoring site, situated in the field on the Upper Campus. The interim funding for the mercury monitor and some contract funding has allowed us to continue monitoring for various metals, pH, particulate matter, and precipitation. The day-to-day maintenance operation is in the capable hands of Trena Hurley and Dean Parker who work under the watchful eye of our Maintenance Manager, Fred Purton.

Our partnership with the Bay of Fundy Ecosystem Project (BOFEP) continues with papers presented at the last BOFEP Meeting held in Sackville, N.B. Participating in the meeting were Peter Wells (Huntsman's Vice Chairman, Education), Gerhard Pohle (Atlantic Reference Centre), Gail Chmura (McGill Representative) and Mick Burt (QES Co-ordinator). The next BOFEP Meeting is scheduled to be held in Saint John in September, 2000, in conjunction with the International Coastal Zone Canada meeting.

The Poster, displaying the various activities of the QES and developed through the hard work of Peter Eaton and Peter Wells, was shown during our 30th Anniversary Celebrations with other Posters, depicting research at Huntsman, in the Christofor Research Laboratory. This Poster is now under revision to show recent additions to our suite of activities. The recent addition of acid fog collectors to support the research of Dr. Roger Cox, and the establishment of a plot of 18 birch trees to support the work of Dr. Kevin Percy has extended our collaborations with Natural Resources Canada (Forestry).

The dedicated work of Wilfred Pilgrim, who was Chairman of the QES Steering Committee since the QES was founded, was recognized at the last meeting of the Committee when he was presented with a pewter mug, suitably inscribed. In making the presentation on behalf of the Committee, Mick Burt detailed the many and significant contributions that Wilfred had made in creating the QES in the first place and leading it through its first five years, particularly in the area of mercury pollution.

Due to his profound knowledge of the mercury issue, Wilfred had been invited to serve as Canada's representative on the joint US/Canada Commission. Jessie Davies has taken over the reins from Wilfred and is in the process of developing a meeting of the Committee with the EMAN Director, Dr. Hague Vaughn, in attendance. Gerhard Pohle, at Huntsman's ARC, has kindly taken over the role of Committee Secretary from Mick Burt.

M.D.B.(Mick) Burt
QES Co-ordinator and
Associate Director, Huntsman

Monitoring Panel

Aquaculture

The year commenced with every one working to complete the two Quonset huts in time for spawning, the incubation of eggs and transferring fish from overcrowded tanks in the Christofor Lab and the Greenhouses. The sturgeon building was the first in operation.

STURGEON

For the first half of the year, chlorine pulses in the municipal water supply ravaged the sturgeon stock. The majority of the eggs and larvae in the June spawning were almost entirely destroyed. Only a few hundred individuals of the 1999 year class have survived. ACOA came to our aid in early summer allowing us to purchase four large carbon filters. Two of these filters protect the Christofor Lab and the remaining two protect the Quonset hut and Christofor greenhouse. This process has worked satisfactorily to date despite some very heavy chlorine residuals.

Re-circulation systems were installed for each 25 ft. tank in the Quonset hut early in the year. The growth of the fish has been such that additional filters have had to be added to cope with the increasing biomass. Densities as high as 100 kg/m^3 have been maintained for several months with less than 10% makeup water. This technology will be used for commercial production. Supreme Sturgeon and Caviar, our industry partners, hope to commence building their commercial operation during the summer of 2000. It is their intention, however, to continue with hatchery and research at Huntsman for another 2-3 years.

Sturgeon - March 2000

The 1997 year class fish have achieved an average weight of 2.5 kg (largest - 3.5 to 4.0 kg). Some of the largest fish are expected to reach maturity in 2000 and may be evaluated for caviar later this year. The 1998 year class comprises approximately 12,000 fish with average weights of 1-1.5 kg. The largest fish from this year class, having been subject to better environmental control, have reached 2.5 kg. A successful spawning of broodstock in May, 2000 has resulted in a large volume of eggs. These were of good quality and a successful larval hatch was obtained.

SMALL FLATFISH

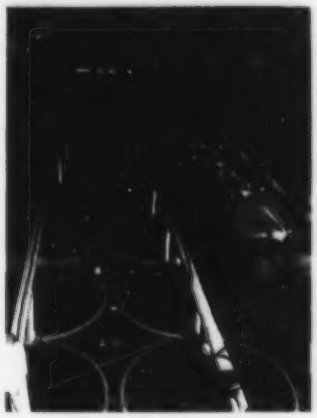
The small flatfish program and its industry proponents had chosen winter, witch, and yellowtail flounder as the preferred species for the 1999/2000 season. The target was set for production of 10,000 juveniles from each species. *Dr. V. Puvanendran (Puvy)* joined Huntsman in February of 1999 to lead the marine fish program. In the spring, he was joined by *Nancy Mouland, Chantal Imbeault* and *Lynn Lush*, partially funded through the Canadian Aquaculture Industry Alliance (CAIA).

Dr. V. Puvanendran

As we could not obtain witch flounder broodstock, the work was done only with winter and yellowtail flounder. In preparation for next year, attempts have been continuing for nearly 12 months now, to get permission from DFO to bring 100 1+ yr. and 2+ yr. witch flounder juveniles raised at the Ocean Science Centre in Newfoundland to St. Andrews. We have just recently met with the committee and have been provided with a protocol that should allow us to

bring in the fish. At the end of March 2000, we had 15,000 winter and 8,000 yellowtail flounders.

Winter flounder spawning was delayed because of construction until mid-May, 1999, although the fish were ready in late March. Ample good eggs were obtained and about 110,000 metamorphosed fish were obtained. High mortalities during the weaning and post-weaning period reduced this number, within four months, to just under 20,000. Losses did not stabalize until about December. Mortalities are surmised to have been due to stress during construction, or inappropriate weaning times/diet/temperature. All the latter hypotheses will be tested in 2000.



Marine Quonset Hut
Flounder Tanks

Yellowtail Flounder

Yellowtail flounders were spawned in mid-May. These were first-spawning F1 fish grown at Huntsman and provided good eggs. Only a portion of the available eggs were incubated to allow the team to focus on the winter flounder. The main broodstock of wild-caught yellowtail flounder were swelling nicely for their usual spawning season of June/July. Unfortunately, temperature in the broodstock tanks rose sharply to 13-15 C and most of the females resorbed their eggs. Some 10,000 metamorphosed fish (15% survival) entered the weaning phase where an unexpected mortality (diarrhea-like symptoms) lost a further 50% of the juveniles.

Weaning of the yellowtail flounder juveniles on to live feed is comparatively shorter (4 weeks) and easier than for winter flounder. It is noticeable that the F2 progeny of yellowtail flounder have grown about 25% faster than that from the wild-caught fish (F1 progeny).

A small spawning was also undertaken with windowpane flounders and a few juveniles grown. These juveniles are showing higher growth (with a higher wt/length ratio) than either of the other two flounders.

The program for building up the broodstock for A/F Protein's transgenic salmon project continues to work well with a number of eggs being shipped to their main hatchery in PEI. A few eggs hatched here have been retained for experimental purposes as well as to maintain a broodstock. Striped bass did not produce very good eggs and the larvae were not grown due to little industrial interest. A few Arctic charr were spawned and hatched to maintain the health of the broodstock.

Dr. John Allen,
Dr. V. Puvenandran,
William Hogans,
Aquaculturists

Atlantic Reference Centre

The Atlantic Reference Centre (ARC), a joint venture of the HMSC and Fisheries and Oceans Canada (DFO), is a natural history museum for aquatic organisms of Atlantic Canada, and a centre for research in biodiversity, evolution, ecology, and applied science. 1999-2000 saw strong activity in all operations of the ARC: growth of its collections; outside utilization of the collection and of staff expertise and facilities; and academic and applied research.

COLLECTIONS: The Scott-Templeman Collection was a major focus of productivity:

- Four Museum Technicians were employed under the following programs:
  - » Young Canada Works in Heritage Institutions, Canadian Museums Association
  - » Human Resources Development Canada
  - » NB Dept. of Labour TopUp Program
  - » NB Dept. of Labour Job Action Program/Step Program

- 2,763 lots of invertebrates and 2,045 lots of fishes were catalogued and 4,451 lots of these groups were computerized including:
  - » All cephalopods from 7 DFO mesopelagic fish cruises from the 1980s (3700 specimens in 63 species and 28 families).

- the Mercer cephalopod collection was unboxed, reconditioned and temporarily shelved (over 4000 lots).

- hundreds of computer museum records were proofed and amended.

- hundreds of invertebrate lots received final internal jar labels.

- Two new compactor shelving carriages were installed, one funded by DFO, and the other by the Tecolote Foundation and the ARC.
  - » The invertebrate section of the collection is expanding onto this new shelving.

Lou Van Guelpen at New Shelving

- The test phase for computer cataloguing the larval fish collection continued and minor bugs in the programming are being addressed (funded by EMAN of Environment Canada).

RESOURCE UTILIZATION: Strong utilization of collections, facilities, and expertise continued in fiscal 1999:

- 12 specimen loans were made for purposes of research and education.
- 4 visiting scientists made extensive use of the collections and resources for their research (from the University of the Azores, the U.S. National Marine Fisheries Service Systematics Laboratory at the Smithsonian Institution, the University Estadual Paulista [Brazil], and the Canadian Musuem of Nature).
- 15 universities made 23 research-related requests - Canada (9), the U.S. (3), the Azores (1), Brazil (1), and Germany (1).
- DFO researchers made 20 requests for specimen identification, scientific advice, and information.
- Scientific reviews consisted of 9 manuscripts for primary publication, 1 U.S. National Science Foundation proposal, and 2 COSEWIC status reports.
- A 1-week workshop was given at the Bamfield Marine Station on biodiversity monitoring.
- Lectures on culture techniques for shortnose sturgeon were given to 5 university and industry groups, and a lecture was given to the Huntsman Teachers Institute on impacts of salmon aquaculture on benthic communities.
- 5 articles were published in the Saint Croix Courier.
- 4 museum tours were given to students from universities, Huntsman courses, and high schools.

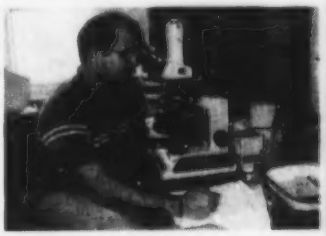
Atlantic Reference Centre

Other users of ARC resources included the Royal Ontario Museum; the Canadian Museum ofNature; the Nova Scotia Museum; NB Dept. of Agriculture, Fisheries & Aquaculture; Atlantic Conservation Data Centre; Cobscook Bay Resource Center; Washington County Technical College; George Street Middle School; Marine Products Research & Development Centre; Ecology Action Centre; Grand Manan Whale & Seabird Research Station; Atlantic Salmon Federation; Future Sea Technologies; Moore-Clark Inc.; CANTOX Inc.; CBC Radio; CBC TV; Gulf of Maine Times; an independent algologist; and the public.

- Staff were active in various committees:
  - » Biodiversity Science Board of Canada - Board of Directors; Ecological & Monitoring Assessment Network (EMAN); Committee on the Status of Endangered Wildlife in Canada (COSEWIC) - Marine Fishes Species Specialist Group; American Society of Ichthyologists & Herpetologists Curation Committee; and the St. Croix Estuary Project - Board of Directors.

RESEARCH: Staff conducted both academic and applied research during the year, as follows:

- Evolution of majoid crabs (in collaboration with Dr. Fernando Marques of University Estadual Paulista); (NSERC).
- Population isolation and phenotypic differences in larvae of Atlantic cod in Placentia Bay, NFLD (in collaboration with I. Bradbury, Memorial University, and C. McGowan, Simon Fraser University); (DFO).
- Developmental abnormalities in mummichogs as indicators of marine environmental quality (in collaboration with Dr. S. Courtenay, DFO); (DFO).
- Benthos assessment at salmon aquaculture fallow sites (NBDAFA)
- Tracking regional enrichment in Lime Kiln Bay, Bliss Harbour, and Deadmans Harbour (NBDAFA).
- Culture techniques for shortnose sturgeon (ACOA, IRAP).
- Larval fish preservation: ethanol acidity from internal label paper (DFO).
- Environmental impact assessment of in-feed Teflubenzuron treatment of Atlantic salmon (CANTOX Inc.).



Dr. Fernando Marques

This research resulted in a book chapter, a technical publication, 3 project reports, a poster and 2 paper presentations at scientific conferences and the instruction of a workshop. Dr. Gerhard Pohle completed the first year of his NSERC Research Grant on crustacean phylogeny and evolution, together with Dr. Marques of University Estadual Paulista in Brazil.

CONTRACTS: The ARC assisted other agencies in their research through contracted processing of field samples:

Ichthyoplankton:

- Georges Bank - U.S. National Marine Fisheries Service GLOBEC program; and Maine coastal waters - ME Department of Marine Resources.

Zooplankton:

- Newfoundland waters and Bay of Fundy- DFO and Scotian Shelf - Queens University.

Benthos/Other:

- Letang estuary - NBDAFA/Stream insects - NBDOE.

BIODIVERSITY: The ARC joined three initiatives this year:

- The Biota of Canada Information Network (5 federal NR departments).
- The Census of Marine Life (Alfred P. Sloan Foundation and U.S. National Ocean Partnership Program).
- Approached by the Atlantic Conservation Data Centre to formalize relationships with them.

Atlantic Salmon Broodstock Development Program

OPERATIONS

The largest 1999 year class fry were segregated at 4,500 per family, vaccinated by immersion, and transferred to the 105 outdoor smolt rearing tanks in June. Monthly sampling of families has yielded average growth co-efficients of 0.99, 1.55, and 2.04 for family groupings from the SGRP (previous Salmon Genetics Research Program) stock, the Maine-Saint John stock and the Gaspe, QC stocks respectively. This compares to an industry average of 1.26.

Surplus parr (500K) from family culling were sold to our industry partners for $100K. To date, 300K smolts have been transferred from these family groups to our partners. The remaining 40K smolts will be transferred shortly. The budgeted 200K smolts were sold for $600K and the surplus 140K smolts were sold for $350K.

Shipping Pedigreed Smolts to Seawater

An additional 32K marked, pedigreed smolts were supplied to our partners for broodstock development.

The Genetics Committee and the Steering Committee met jointly on June14-15, 1999. Two new industrial partners were admitted for a total of eight companies representing 95% of the 9 million smolts produced annually in New Brunswick. The committees endorsed proceeding with DNA analysis of our strains, and families, for maintaining pedigrees. To this end, tissue samples have been sent to Drs. Ferguson and Danzmann at the University of Guelph for analysis.

COLLABORATIVE RESEARCH

Glebe and Harmon (DFO) are continuing, industry and DFO-supported, studies of "out of season" smolt transfers to marine farms. This is an industry priority for smolt cost reduction. Up to 50% of smolt transfers in Norway, Chile and British Columbia are fall tranfers, compared to less than 5% in New Brunswick. In April, the DFO contract for $20K in support of this project was renewed.

Glebe and Harmon are continuing ISA vaccine trials in a recently completed level 2 quarantine lab at the St. Andrews Biological Station. These trials are endorsed by the ISA Research Working Group. Similar trials are also proceeding at the Research and Productivity Council and the Atlantic Veterinary College.

PRESENTATIONS

Harmon and Glebe presented a paper entitled "Underyearling Smolt (S0) Production in New Brunswick" at the 1999 Atlantic Aquaculture Exposition and Fair's Freshwater Workshop, St. Andrews, NB (chaired by Glebe).

Glebe presented a paper entitled "Atlantic Salmon Broodstock Development Program Overview" to an industry workshop sponsored by the Moore Clark Co. Glebe and Harmon are presenting three papers on their work at the upcoming Aquaculture Association of Canada meeting (AAC2000) in Moncton at the end of May.

Grading & Branding Pre-Smolts

Dr. Brian Glebe
Program Manager

Administration

Last year was extremely busy and saw a number of changes. During the summer, new computers were installed for all Administration staff as the old computers were out-dated and not Y2K compliant. Upgrades were also installed for office and network software further enhancing efficiency. This spring, with the generous assistance of NBTel, we have just installed a 128 kb high speed line providing Internet access to both our users and staff.

Over the course of the year we have coordinated, and participated in, the *Strategic Planning* process and developed a new financial reporting system. Early this year we applied for, and won, *Canada's Top Employer of Youth Award for New Brunswick* from The Conference Board of Canada.

In my human resource role, I am pleased to report that we were fortunate to find *Carol Baker* to help us with marketing, public relations, communications and development. Carol came to Huntsman from the Saint John Board of Trade in July as she and her husband wanted to live in St. Andrews. Since her arrival, she has made significant contributions towards our annual giving campaign, web site, and promotional activities. Unfortunately, due to our financial results not meeting expectations, two positions had to be eliminated. *Susan Hill* and *Terry Jodouin* have been greatly missed.

Late last fall we were awarded six positions under the provincial Department of Labour's *Community Pride Program*. Having these positions from October to March allowed us to undertake the new additions and renovations at the Aquarium/Museum, the Carroll Wright Room, and the University of Guelph apartment. One of these six positions was awarded to the ARC and was of immense help with their contract work. This past fall we took advantage of the high school co-op program to bring in Grade 12 students for the Aquarium, Maintenance, the ASBDP and Administration. We hope this is something we can do more of in the future.

Carroll Wright Room - Lecture Theatre and Lounge

With all the changes taking place we are very proud of our accomplishments. As always, our successes are a result of all the hard work and dedication of the team as a whole. I would like to extend a special thanks not only to those individuals mentioned above, but also to *Mindy Brown, Brenda Fullerton*, and *Debbie Harmon* for their help and assistance throughout the year.

Paul McKinley
Director, Administration and Finance

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Karen Ludwig
Anthony T. Mais
Andre Martel
Gary Maw
G. Wallace F. McCain
Terrence McDonnell
Dan McLaughlin
Stephen T. Molson
Thomas W. Moon
Jeff & Holly O'Rourke
David Oxley
John and Frances Remer
James D. Rising
Evan & Michelle Ross
Bev and Milly Scott
Ellen K. Steeves
Michael Tanchak
A. Melvin Turner
Robert Vadas
John M. Webster
David Wells
J. Richard Whittaker
Fred Whoriskey

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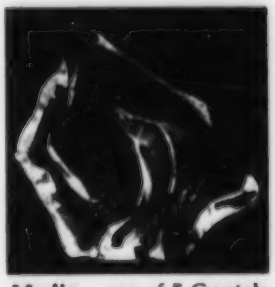

Marlin - one of 5 Crystals Donated to the Aquarium/ Museum by Swedish Master Glass Craftsman, Mats Jonasson.

Staff Notes

Dr. John H. Allen is a member of the Regional Association for Research in the Gulf of Maine (RARGOM). Locally he sits on the Chamber of Commerce and the Board of the Local Water Utility Committee.

Dr. Allen gave a talk in January at McGill and MacDonald College in Montreal and Queen's University in Kingston on the topic of **Finfish Aquaculture in Atlantic Canada**. While at these universities, Dr. Allen also visited Biology Departments speaking with a number of professors about Huntsman facilities, courses, programs and services.

Dr. M. D. B. (Mick) Burt, is Chair of the Scientific Committee for the next International Congress of Parasitology (held every four years) in 2002 in Vancouver. He chaired the Organizing Committee of Canadian Society of Zoologists Annual Meeting held in St. Andrews in May. He is also a member of the Organizing Committee for Aquaculture 2000 Conference held in Moncton in May as well as for Coastal Zone Canada 2000 (held every two years) coming up in Saint John, NB in September.

Dr. Brian Glebe was quoted in an article in **The New York Times** on September 14, 1999 entitled *"As a Species Vanishes, No One Can Say Why."*

Dr. V. Puvandendran (Puvy) presented a talk entitled "Larval rearing techniques of yellowtail flounder" at the Canadian Conference for Fisheries Research (CCFFR) and Society of Canadian Limnologists (SCL) Conference held at the Lord Beaverbrook Hotel in Fredericton in January. His paper was co-authored by Danny Boyce and Dr. Joe Brown of the Ocean Sciences Centre, Memorial University of Newfoundland. He also presented a poster entitled "Small flatfish scientific program at the Huntsman Marine Science Centre," co-authored with Executive Director, Dr. John H. Allen.

Dr. Gerhard Pohle was re-appointed as an **Adjunct Professor** in the Department of Biology, Faculty of Science, Applied Science and Engineering, at the University of New Brunswick in Saint John. Dr. Pohle also serves on the Biodiversity Science Board of Canada. At their January meeting in Toronto, this group released a new paper - *"The Biodiversity Science Problem in Canada: an Unrecognized Crisis"* which Gerhard helped to prepare.

Lou Van Guelpen serves on the Steering Committee for the National Conference on Marine Bioinvasions at the Massachusetts Institute of Technology. As a member of the American Society of Ichthyologists and Herpetologists, he serves on two sub-committees of the Curation Committee: (i) Supplies and Practices; and (ii) Practices and Curation Newsletter.

Tracey Dean presented her thesis - *Second-Growth Habitat Use and Survival Rates of Migrant & Resident Land Birds, North Andros Island, Bahamas* on September 13, 1999 and was granted her **Master of Science Degree in Forestry** from the University of New Brunswick - Fredericton.

Dr. Allen presenting Huntsman Stamp First Day Cover to Tony Huntjens, MLA and Greg Thompson, MP

Huntsman Staff

** no longer employed by Huntsman*

Administration
John H. Allen, Executive Director
M.D.B. (Mick) Burt, Director Academic Programs/Associate Director
Paul McKinley, Director of Administration & Finance
Carol Baker, Development/PR Coordinator
Mindy Brown, Comptroller
Tracey Dean, Public Education Coordinator
Brenda Fullerton, Accts Rec./Reservations Clerk
Debbie Harmon, Accts Payable/Purchasing Clerk
Susan Hill, Office Secretary*
Derrick Iles, Senior Scientist
Thérèse Jodouin, Directors' Secretary*
Charlotte McAdam, ASFA Editor
Haseeb Randhawa, Temporary Academic Secretary*
Dick Saunders, Senior Scientist
W. B. (Bev) Scott, Senior Scientist Emeritus
Lauren Trute, Public Education Summer Student*
Marlene Wilbur, ASFA Editor *

Aquarium/Museum
Jim McElman, Manager
Heather Holmes, Cashier
Mary Sollows, Interpretive Program Coordinator
Interpreters:
Jayme Fougere*
Nicola Johnson*
Monic Morgan*

Atlantic Reference Centre
Gerhard Pohle, Curator Invertebrates
Lou Van Guelpen, Collections Manager
Bill Hogans, Taxonomic Specialist
Research Assistants:
Mary Craig
Brent Cruickshank
Taryn Deering
Ruth Dunfield
Emily Feeney
Brian Frost
Mary Greenlaw
Nancy Lawton
Kristen Leavitt*
Cindy Needler
Karen Ross
Morton Cook
Alice Fulton*
Mike Groom
Richard Ingersoll
Hylton McFarlane
Michael Perron
Lynette Richardson

Christmas Party at the Algonquin Hotel

Atlantic Salmon Broodstock Development Program
Brian Glebe, Program Manager
Jamie Olsen, Hatchery Manager

Aquaculture
Bill Hogans, Freshwater Aquaculture Manager
Velmurugu Puvanendran (Puvy), Marine Fish Project Manager.
Research Technicians:
Christa Carpenter*
Ayesha Hosain*
Chantal Imbeault
Lynn Lush
Nancy Mouland*
Christa Waters*

Maintenance
Fred Purton, Manager, Maintenance /Technical
Eldon Carter, R/V Captain
Trena Hurley, Laboratory Technician
Maintenance Technicians:
James Bockus*
Mark Burgess
Stephen Foster
Dean Parker

Residences
Nancy Leavitt, Residence Manager
Donna Crosby, Cook
Rosalie Curran, Cook
Tammy Donahue, Housekeeping
Kathy Gowan, Housekeeping
Debra Gregory, Cook
Linda Muise, Housekeeping
Judy Olsen, Cook

Thank you also to our Community Pride Workers, Part-time Staff, Co-op Students and Volunteers.

UNIVERSITIES

UNIVERSITY	RESEARCHER	PROJECT
Acadia	Dr. M.J. Dadswell	Interannual variation and intensity of scallop spat settlement
British Columbia	Dr. M. Adamson	Development of research themes and organization of the 10th International Congress of Parasitology
Concordia	Dr. J.D. McLaughlin	Seasonal population dynamics of the intestinal parasite fauna of eider ducks
Guelph	Dr. J.S. Ballantyne G. Spencer A. Rosenberger J. Kowlewski	Factors affecting mitochondrial membrane permeability in elasmobranch fishes
McGill	Dr. G.L. Chmura C. Paquette	Ecology and productivity of salt marshes
Memorial	Dr. G.L. Fletcher M. King M. Shears	Transgenic development of accelerated growth and cold tolerance in Atlantic salmon Cultivation of rotifers as live feed for flatfish
Mount Allison	Dr. R.B. Aiken A. Ellis A. Greer L. Shouldice	Hermaphroditism and mating systems in the nudibranch mollusc, *Dendronotus frondosus*
	Dr. I. Kaczmarska-Ehrman L. Cameron	Factors affecting sporulation in marine phytoplankton
	Dr. M. Wilkie	Enzymes in dogfish livers
New Brunswick	Dr. M. Barbeau	Behaviour of scallops under predation by crabs and starfish
	Dr. T.J. Benfey	Sex manipulation of fishes used in aquaculture Oxygen requirements in aquaculture using recirculating systems
	Dr. M.B.D. Burt C. Noonan Dr. L. Jarecka	Survey of parasites potentially pathogenic to halibut Ontogeny and phylogeny of cestodes in elasmobranch fishes
	Dr. A.W. Diamond	Ecology and population dynamics of seabirds
	Dr. G. W. Saunders	Molecular systematics of Algae with particular reference to microscopic rhodophytes

UNIVERSITIES

UNIVERSITY	RESEARCHER	PROJECT
Prince Edward Island	Dr. L. Hammell	Diseases in aquacultured Atlantic salmon
	Dr. A. Mustafa	Epidemiology and pathogenicity of sea lice on aquacultured Atlantic salmon
	Dr. D. Speare	Metabolic oxygen requirements of small pleuronectids under aquaculture conditions
Saint Mary's	Dr. D.K. Cone Dr. D. Barker	Elucidation of marine myxosporean life cycles Population dynamics of parasites of chain pickerel, *Esox niger* Development of control mechanisms for parasites and micro-organisms potentially pathogenic to halibut
Toronto	Dr. D. Calder	Vertical zonation and seasonality of the Hydrozoa in Passamaquoddy Bay, NB
Waterloo	Dr. D. Dietz-Hicks	Biology of *Fundulus heteroclitus*
Western Ontario	Dr. M. Owen	Ecology of deep sea plankton
Wilfred Laurier	Dr. L. E. J. Lee	Imposex in gastropods of Passamaquoddy Bay

OTHER INSTITUTIONS

INSTITUTION	RESEARCHER	PROJECT
Atlantic Salmon Federation	Dr. F. Whoriskey S. Adamovitch M. Best S. Tinker	Fish testing for disease
Mirimachi River Environmental Assessment Committee	N. Comeau T. Jardine	Spectrophotometry of pollutants in collaboration with Dr. V. Zitko
Mount Desert Island	Dr. T. Koob	Biology and physiology of hagfish

GOVERNMENT DEPARTMENTS

DEPARTMENT	RESEARCHER	PROJECT
DFO/NBDAFA Broodstock Program	Dr. Brian Glebe	Genetic improvement of Atlantic salmon for smolt production for aquaculture
Environment Canada (EMAN)	Dr. S. Beauchamp	Monitoring atmospheric mercury

GOVERNMENT DEPARTMENTS

Fisheries and Oceans Canada, St. Andrews	Dr. F. Page D. Aldous	Hydrography of Passamaquoddy Bay and the Bay of Fundy Herring population dynamics
Natural Resources Canada (Forestry)	Dr. R. Cox	Effects of acid fog on growth of birch trees
	Dr. K. Percy	Comparative growth of cloned birch under different climatic conditions
NB Environment with EMAN	Mr. R. Hughes Mr. W. Pilgrim	Atmospheric monitoring for metals, pH, particulates, and precipitation
NB Agriculture, Fisheries & Aquaculture	Mr. Rex Hunter	Effects of aquaculture on benthos under sea cages
Pelagics Research Council	S. Arsenault M. Corporon	Monitoring and assessing the status of pelagic organisms

INDUSTRY

COMPANY	RESEARCHER	PROJECT
Akwesasne Area Management Board	Mr. Jeffrey Lazore	Development of protocols for aquaculture of lake sturgeon
Bayside Stevedores Inc.	Mr. P. Fry	Accelerated growth of striped bass during winter using waste heat from a refrigeration plant
Connors Bros., Limited	Mr. A. Godin Dr. C. Frantsi	Development of protocols for haddock aquaculture
Hooper's Hatchery	Mr. B. Hooper	Development of protocols for striped bass aquaculture
Maritime Mariculture Inc.	Mr. D. Raymond P. Brooking A. Kinney F. Powell	Development of protocols for halibut aquaculture
Supreme Sturgeon and Caviar, Inc.	Mr. B. Tucker/Mr. D. Breau C. Carpenter B. Hogans L. Tucker	Maintenance of protocols for short-nosed sturgeon aquaculture

HUNTSMAN MARINE SCIENCE CENTRE

DIVISON	RESEARCHER	PROJECT
Atlantic Reference Centre	Dr. G. Pohle	Ancestor-dependent relationships of Crustacea using comparative development and morphology
	Mr. Lou Van Guelpen	Taxonomy and systematics of larval fishes
	Dr. F. Marques	Phylogeny of larval crustaceans
Academic Programs	Dr. W. B. Scott	Ichthyology
	Ms. T. Dean	Monitoring migration of passerine birds Monitoring avian productivity and survivorship
	Dr. M.D.B. Burt Dr. D. J. McLaughlin	Changes in the parasite fauna of herring gulls over a 35-year period
	Dr. M.D.B. Burt	Survey of parasites of *Corophium;* their role in migration of wading birds
	Mr. H. Randhawa Dr. M.D.B. Burt Dr. M. E. Scott	Determination of host specificity of cestodes in elasmobranch fishes in Passamaquoddy Bay

GRADUATE STUDENTS

STUDENT	SUPERVISOR	PROJECT
E. Battaller (UNB-F)	Dr. A. Boghen and Dr. M.D.B. Burt	Biotic and abiotic factors affecting aquaculture of oysters, *Crassostrea virginica*
B. Beecher (McGill)	Dr. G.L. Chmura	Determination of carbon concentrations in regional salt marshes
S. Corrigan (UNB-F)	Dr. A. Curry	Studies of the inter-tidal fauna associated with rock weed, *Ascophyllum nodusum*
A.S. Didyk (UNB-F)	Dr. M.D.B. Burt	Effects of migration on the parasite fauna of wading birds
G. Fines (Guelph)	Dr. J. S. Ballantyne	Factors affecting mitochondrial membrane permeability in elasmobranch fishes
T. Harper (UNB-F)	Dr. G. W. Saunders	Molecular systematics of Algae with particular reference to microscopic Rhodophyta
C. Hendry (UNB-F)	Dr. T. J. Benfey	Sex manipulation in halibut aquaculture
L.A. Henry (Toronto)	Dr. D. Calder	Zonation and seasonality of *Dynamena pumila* (Hydrozoa; Sertulariidae) in Passamaquoddy Bay

GRADUATE STUDENTS

A. Ibrahim (UNB-F)	Dr. B.M. MacKinnon	Effect of zinc on Atlantic salmon during smolt formation and subsequent resistance to sea lice
P. MacIsaac (UPEI)	Dr. D. Speare	Metabolic oxygen requirements of pleuronectids under simulated aquaculture conditions
K. Mawhinney (UNB-F)	Dr. A.W. Diamond	Predation on eider ducks and their population dynamics
J. Mullen (Saint Mary's)	Dr. D.K. Cone	Host specificity and pathogenesis of gynodactylids on flatfish
E. Parker (UNB-F)	Dr. T.J. Benfey	Oxygen requirements in aquaculture recirculation
P. Quarrar (UNB-F)	Dr. M.D.B. Burt	Determination of sealworm sibling species status
H. Randhawa (McGill)	Dr. M.D.B. Burt and Dr. M.E. Scott	Identification of parasites of skates and dogfish and host specificity
R. Singh (UNB-SJ)	Dr. B.A. MacDonald	Feeding behaviour in lamellibranch molluscs
J. A. Weldon (UNB-F)	Dr. M.D.B. Burt	Determination of shelf-life of edible mussels
M. Wong (UNB-F)	Dr. M. Barbeau	Scallop behaviour under predation

HUNTSMAN MARINE SCIENCE CENTRE

BRANCH	RESEARCHER	PROJECT
Aquaculture	Dr. V. Puvanendran	Development of aquaculture protocols for witch, windowpane, yellowtail and winter flounder
	Mr. W. E. Hogans	Development of aquaculture protocols for short-nosed sturgeon
	Dr. J.H. Allen	Development of recirculation sytems for on-land aquaculture

The ***Huntsman Marine Science Centre*** was established in 1969 as a not-for-profit, charitable organization. As a consortium, we are supported by our members (which include universities, and both federal and provincial departments) as well as by corporations and the general public. Our facilities are located in historic St. Andrews, New Brunswick, at the mouth of the Bay of Fundy, one of the most biologically active bodies of water in the world, where we have earned a reputation for excellence in marine science education and research.

Our Mission:

"...through research and education, HMSC will enhance knowledge and provide the leadership necessary to achieve understanding and effective management of the coastal environment..."

is achieved through the activities of our two major branches. The *"Education"* branch is responsible for both Academic and Public Education Programs and the Aquarium/Museum. The *"Applied Research"* branch contains our aquaculture program, the Atlantic Reference Centre, and the Atlantic Salmon Broodstock Development Program. By working together, these branches promote the advancement of knowledge through research, the transfer of this knowledge through education, and the training of future scientists to ensure the future of this nation's - and the world's - ocean resources.

Huntsman Marine Science Centre

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